Work Plan

For

Expert Toxicologist for Region V

February 19, 1982

EPA Project No. 68-03-3113

This document has been prepared pursuant to EPA Contract TMS III Task No. 42-6 for the U.S. Environmental Protection Agency Municipal Environmental Resaerch Laboratory, Cincinnati, Ohio

Submitted by:

JRB Associates
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McLean, VA 22102

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A Company of Science Applications, Inc.

February 18, 1982

Mr. James M. Bzdusek
Contracting Officer
Contract Management Division
Negotiated Contracts Branch
U.S. Environmental Protection Agency
26 W. St. Clair
Cincinnati, OH 45268

Reference: EPA Contract No. 68-03-3113, Task 42-6
JRB Project No. 2-817-03-956-47

Subject: Work Plan Submittal

Dear Mr. Bzdusek:

JRB is pleased to submit a work plan for providing expert toxicology and other assistance to EPA Region V in an enforcement case for the BASF/FMT site in Riverview, Michigan. The expert toxicologist for this task, Dr. C. D. Klaassen is available to provide up to thirty hours a month for the duration of this task.

Enclosed are two signed work assignment sheets, our approach to assisting Region V, costs for conducting needed activities and resumes for Dr. Klaassen and two members of the JRB staff, Mr. Roger S. Wetzel and Dr. G. T. Farmer, who will provide input to this task.

It should be noted that the total estimated cost for this work assignment does not include any of the award fee pool, which on this work assignment could be $1,411 (6% of $23,522). This is in addition to the total estimated cost in the work plan.

Please let me know of your questions and comments.

Sincerely,

Roger S. Wetzel for

Robert A. Colonna
Vice President

Enclosures

cc: Mr. Michael Mutnan, EPA Region V
Mr. Frank Freestone, EPA Project Officer

WORK ASSIGNMENT ENVIRONMENTAL PROTECTION AGENCY CINCINNATI, OHIO 45268	EPA CONTRACT NO 68-03-3113
	CONTRACTOR JRB Associates, Inc.
	ASSIGNMENT NO. 42-6
	ASSIGNMENT CHANGE NO.
TITLE EXPERT TOXICOLOGIST FOR REGION V	DATE January 18, 1982

DESCRIPTION

Identify 2-3 candidate expert toxicologists for Region V selection to participate in legal proceedings for BASF/FMT, Riverview, MI dispute over land contaminated by toxic chemicals. Toxicologist duties shall include but not be limited to:

1) Describe hazards of identified compounds found or suspected to be present at the subject site by preparing data sheets for use in pre-trial settlement or trial proceedings.

2) Review and interpret toxicological data supplied by the defendant.

3) Assist in preparing for defendant depositions and trial examination of defendant's witnesses in reference to toxicological issues.

4) Prepare a written toxicological assessment for use in a settlement document.

5) Review past and present production processes used by the defendant so as to assess past and potential hazards associated with waste materials generated by those processes.

6) Assist in preparing a written remedial plan to be presented as a settlement for relief by the court. The expert consultant shall provide guidance on the toxicological and technical aspects of the plan which shall be prepared by US EPA personnel.

7) Review testimony of defendant expert toxicological witnesses.

8) Provide other, similar, related activities pertaining to EPA's general expert consultant requirements for a toxicologist for the subject legal case. This shall include site inspections as necessary, attendance at meetings and other such activities as directed.

ESTIMATE OF	GOVERNMENT ESTIMATE	CONTRACTOR ESTIMATE
Labor Hours	300	300
Duration of Work (Tech. Effort)	6 (months)	1 year
Completion Date (Inc. Reports)	6/30/82	March 1, 1983

TPM Signature Anthony N. Tafuri	ORG CODE	TELEPHONE	DATE

APPROVALS (as applicable)	SIGNATURE	DATE
BRANCH CHIEF		
DIVISION CHIEF		
Project Officer	Frank J. Freestone	1-14-82
CONTRACTING OFFICER		

CONTRACTOR'S REPRESENTATIVE ACKNOWLEDGMENT

SIGNATURE	TITLE	DATE
Roger S. Vetter	Sr. Contract Representative	2/18/82

EPA FORM 1395

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APPROVALS (as appropriate)	SIGNATURE	DATE
Project Officer	Frank J. Freestone	1-19-82

CONTRACTOR REPRESENTATIVE ACKNOWLEDGMENT

SIGNATURE	TITLE	DATE
Roger S. Wetzel	Sr. Contract Representative	2/18/82

NOTICE

This work plan has been submitted in confidence and contains materials, data and information on which we assert a claim of protection from release under the provisions of 5 U.S.C. 552. The data contained on all pages of this work plan shall not be disclosed, except for evaluation purposes. The Government shall have the right to use or disclose this data to the extent provided in the contract. This restriction does not limit the Government's right to use or disclose data obtained from another source without restriction.

Task 1. Selection of Expert Toxicologist and Work Plan Preparation

A number of activities preceded the selection of the expert toxicologist, Dr. C. D. Klaassen, for Region V assistance. They are as follows:

- Reviewed qualifications of staff toxicologists and support personnel
- Reviewed qualifications of experts recommended by staff, EPA and other sources
- Submitted qualifications to EPA Region V following an initial screening by JRB
- Discussed qualifications of candidates with Region V
- Following selection of the expert by Region V, discussed scope of task with expert and obtained verbal agreement to participate
- Will obtain signed consulting agreement from expert contingent upon work plan approval.

All but the last activity were performed as part of a management function for the overall JRB MERL contract and, as such, were not billed to this task.

Following EPA approval of the expert toxicologist this work plan was prepared based on a scope of work prepared by EPA, background information on the case assembled by EPA and conversations with the EPA technical manager on this case, Mr. Michael Mutnan, and the EPA attorney, Mr. Gerald Frumm.

Following work plan approval, case assistance will be provided as described in the following tasks.

Task 2. Data Review and Analysis

By the time the work plan is approved, the expert toxicologist will have received background data on the case and will conduct a thorough review and analysis of the information. A concurrent brief review will be performed by JRB. The objectives of the toxicologist's review are to determine the following:

- Strength of the case based on toxic properties of materials found or suspected at the site

- Impact of toxicity of these materials on surrounding environment and on people who may frequent the site
- Particular toxicity-related problems that should be considered in the remedial plan or for site closure.

The objectives of JRB's review are to determine the following:

- Strength of sampling data
- Approaches for remedial action
- Value of investigating the history of the production plant to see if process-related wastes other than those already found could be present at the site.

Following the data evaluation activities, the expert toxicologist, JRB and EPA will meet in Chicago to discuss strategy for the case. If the toxic properties of the materials at the site do not warrant further development of the case, then emphasis will be placed on negotiations with the company to obtain a more complete site closure. If further development of the case is warranted, then various activities described in Task 3 will be conducted depending on case needs.

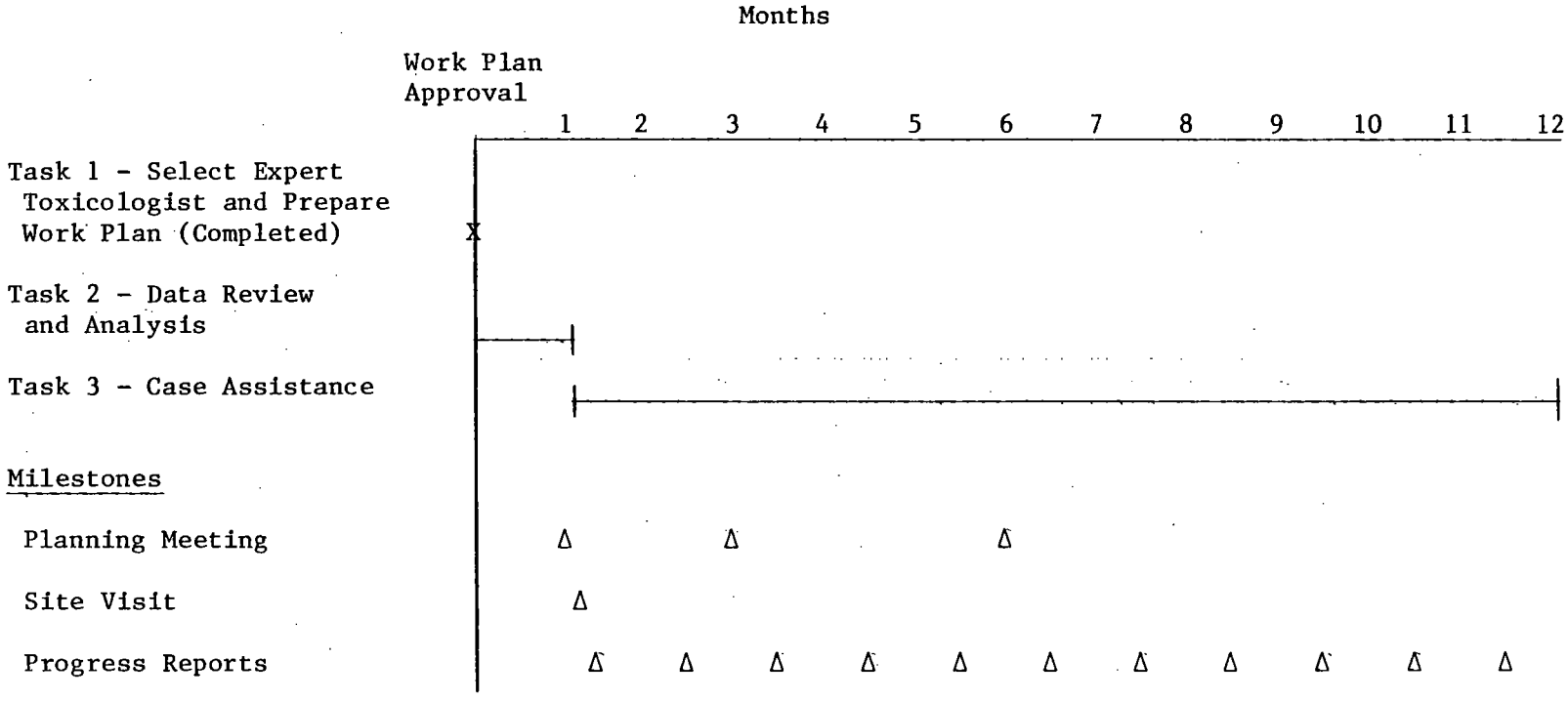
Task 3. Case Assistance

The following are brief descriptions of activities that may be performed depending on case needs.

- Develop a remedial plan that will address the hazards associated with the site and estimate the costs for implementing the plan
- Define hazards of compounds identified or suspected to be present at the site
- Review and interpret defendent's toxicological data and any defendent expert toxicological witnesses
- Assist in preparing for defendant depositions and trial examination of defendent's witnesses for toxicological issues
- Prepare a written toxicological assessment for use in a settlement document
- Review past and present production processes, generated wastes, and related potential hazards
- Perform site inspections, attend meetings and perform other similar activities related to the legal case.

Depending on how the case progresses, it appears that some combination of the above activities will be needed. Assistance will be provided by the expert toxicologist and JRB as the need arises until Task resources are expended.

PROJECT SCHEDULE



STAFFING REQUIREMENTS BY TASK

Personnel	Hours Task 1	Task 2	Task 3
R. Wetzel, Task Coordinator	16	16	52
Dr. C.D. Klaassen, Expert Toxicologist	8	30	112
Dr. G.T. Farmer, Senior Hydrogeologist	-	16	34
Project Administrator	8	4	4
Clerical	8	8	32

Curriculum Vitae

Curtis Dean Klaassen, Ph.D.

Date of Birth: November 23, 1942

Place of Birth: Fort Dodge, Iowa

Marital Status: Married, two children

Degrees:

B.A., Wartburg College, 1964 (Biology)
M.S., University of Iowa, 1966 (Pharmacology)
Ph.D., University of Iowa, 1968 (Pharmacology)

Certification:

American Board of Toxicology

Academic Appointments:

Instructor of Pharmacology and Toxicology, University of Kansas Medical Center, 1968-1970.
Assistant Professor of Pharmacology and Toxicology, University of Kansas Medical Center, 1970-1974.
Associate Professor of Pharmacology and Toxicology, University of Kansas Medical Center, 1974-1977.
Guest Professor of Clinical Pharmacology, University of Bern, Bern, Switzerland, June-August, 1975.
Visiting Scientist, Department of Toxicology, Institute of Radiation and Environmental Research (GSF), Munich, Germany, March-August, 1978.
Professor of Pharmacology and Toxicology, University of Kansas Medical Center, 1977-

Professional Societies:

Sigma Xi (1968)
American Association for the Advancement of Science (1969)
Society of Toxicology (1970)
American Society of Pharmacology and Experimental Therapeutics (1970)
American Association for the Study of Liver Diseases (1971)
Society of Experimental Biology and Medicine (1972)

Honors:

Graduated Magna Cum Laude, Wartburg College
Public Health Service Predoctoral Fellowship Award, 1965-1968
Public Health Service Research Career Development Award, 1971-1976
Achievement Award, Society of Toxicology, 1976
Alexander von Humboldt Fellow, 1978

National Committees:

Toxicology Field Editor for the Journal of Pharmacology and Experimental Therapeutics, 1974-
Editorial Board of Chemico-Biological Interactions, 1976-1978.
Toxicology Study Section, Division of Research Grants, National Institutes of Health, USPHS, 1976-1980.
Executive Committee of the Drug Metabolism Division, American Society of Pharmacology and Experimental Therapeutics, 1976-1979.
National Library of Medicine, Toxicology Information Subcommittee, Toxicology Data Bank Review, 1976-1981
Treasurer of the Drug Metabolism Division, American Society of Pharmacology and Experimental Therapeutics, 1977-1979.
Food and Drug Administration, Bureau of Drugs, Gastrointestinal Drugs Advisory Committee, Subcommittee on Hepatotoxicity, 1977.
Associate Editor of Journal of Pharmacological Methods, 1977-
Education Committee, Society of Toxicology, 1979-1981, Chairman 1980-1981.
Associate Editor of Toxicology and Applied Pharmacology, 1980-
Editorial Board of Hepatology, 1980-
Editorial Board of Journal of Toxicology and Environmental Health, 1980-
Subcommittee on Toxicology of the Committee on Educational Affairs of American Society of Pharmacology and Experimental Therapeutics, 1981-
Membership Committee, Society of Toxicology, 1981-

Consultant:

Midwest Research Institute
Procter and Gamble
Baxter Travenol
University of Rochester
Searle
National Institutes of Health
Food & Drug Administration
Environmental Protection Agency
  Reviewed Isophorone Criteria Document, 1979.
  Reviewed Benzene Hexachloride Criteria Document, 1979.
  Reviewed Chromium Criteria Document, 1980.
  Reviewed 1,1,1-Trichloroethane Criteria Document, 1980.
  Authored Criteria Document on Dichlorethylenes, 1980-1981.
University of Texas Medical Branch at Galveston

BIBLIOGRAPHY

Theses:

1. The Relative Effects of Various Chlorinated Hydrocarbons on Liver and Kidney Function.

2. Hepatic Disposition of Sulfobromophthalein and Phenol-3,6-Dibromophthalein Disulfonate.

Full-length Manuscripts:

1. Klaassen, C.D. and Plaa, G.L.: Relative effects of various chlorinated hydrocarbons on liver and kidney function in mice. Toxicol. Appl. Pharmacol. 9:139-151, 1966.

2. Klaassen, C.D. and Plaa, G.L.: Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. Toxicol. Appl. Pharmacol. 10:119-131, 1967.

3. Klaassen, C.D. and Plaa, G.L.: Susceptibility of male and female mice to the nephrotoxic and hepatotoxic properties of chlorinated hydrocarbons. Proc. Soc. Exp. Biol. Med. 124:1163-1166, 1967.

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5. Roberts, R.J., Klaassen, C.D. and Plaa, G.L.: Maximum biliary excretion of bilirubin and sulfobromophthalein during anesthesia-induced alteration of rectal temperature. Proc. Soc. Exp. Biol. Med. 125:313-316, 1967.

6. Klaassen, C.D. and Plaa, G.L.: Species variation in metabolism, storage and excretion of sulfobromophthalein. Am. J. Physiol. 213:1322-1326, 1967.

7. Klaassen, C.D. and Plaa, G.L.: Hepatic disposition of phenol-dibromophthalein disulfonate and sulfobromophthalein. Am. J. Physiol. 215:971-976, 1968.

8. Klaassen, C.D. and Plaa, G.L.: Effect of carbon tetrachloride on the metabolism, storage, and excretion of sulfobromophthalein. Toxicol. Appl. Pharmacol. 12:132-139, 1968.

9. Klaassen, C.D. and Plaa, G.L.: Studies on the mechanism of phenobarbital-enhanced sulfobromophthalein disappearance. J. Pharmacol. Exp. Ther. 161:361-366, 1968.

10. Klaassen, C.D. and Plaa, G.L.: Plasma disappearance and biliary excretion of iodocyanine green in rats, rabbits and dogs. Toxicol. Appl. Pharmacol. 15:374-384, 1969.

11. Klaassen, C.D., Roberts, R.J. and Plaa, G.L.: Maximal biliary excretion of bilirubin and sulfobromophthalein during various rates of infusion and in rats of different weights and strains. Toxicol. Appl. Pharmacol. 15:143-151, 1969.

12. Klaassen, C.D. and Plaa, G.L.: Comparison of the biochemical alterations elicited in livers from rats treated with carbon tetrachloride, chloroform, 1,1,2-trichloroethane and 1,1,1-trichloroethane. Biochem. Pharmacol. 18:2019-2027, 1969.

13. Harbison, R.D., Klaassen, C.D. and Becker, B.A.: Hemodynamics of the isolated perfused liver of hypothyroid and hyperthyroid rats. Proc. Soc. Exp. Biol. Med. 132:96-99, 1969.

14. Klaassen, C.D.: Biliary flow after microsomal enzyme induction. J. Pharmacol. Exp. Ther. 168:218-223, 1969.

15. Klaassen, C.D.: Ethanol metabolism in rats after microsomal metabolizing enzyme induction. Proc. Soc. Exp. Biol. Med. 132:1099-1102, 1969.

16. Klaassen, C.D.: Plasma disappearance and biliary excretion of sulfobromophthalein and phenol-3,6-dibromophthalein disulfate after microsomal enzyme induction. Biochem. Pharmacol. 19:1241-1249, 1970.

17. Klaassen, C.D.: Effects of phenobarbital on the plasma disappearance and biliary excretion of drugs in rats. J. Pharmacol. Exp. Ther. 175:289-300, 1970.

18. Sabih, K., Klaassen, C.D. and Sabih, K.: Combined gas chromatography and high resolution mass spectrometric determination of probenecid. J. Pharm. Sci. 60:745-748, 1971.

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22. Klaassen, C.D.: Biliary excretion of barbiturates. Brit. J. Pharmacol. 43: 161-166, 1971.

23. Hunter, A. and Klaassen, C.D.: Species difference in the plasma disappearance and biliary excretion of procaine amide ethobromide. Proc. Soc. Exp. Biol. Med. 139:1445-1450, 1972.

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35. Klaassen, C.D.: Biliary excretion of arsenic in rats, rabbits and dogs. Toxicol. Appl. Pharmacol. 29:447-457, 1974.

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39. Klaassen, C.D.: Stimulation of the development of the hepatic excretory mechanism for ouabain in newborn rats with microsomal enzyme inducers. J. Pharmacol. Exp. Ther. 191:212-218, 1974.

40. Klaassen, C.D. and Fitzgerald, T.J.: Metabolism and biliary excretion of ethacrynic acid. J. Pharmacol. Exp. Ther. 191:548-556, 1974.

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101. Iga, T. and Klaassen, C.D.: Uptake of bile acids by isolated rat hepatocytes. Biochem. Pharmacol. (In press).

102. Wong, K.L. and Klaassen, C.D.: Toxic effects of cadmium in the brain of newborn rats. Toxicol. Appl. Pharmacol. (Submitted).

103. Stacey, N.H. and Klaassen, C.D.: Effects of phospholipase A_2 inhibitors on diethyl maleate induced lipid peroxidation and cellular injury in isolated rat hepatocytes. J. Toxicol. Environ. Hlth. (In press).

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105. Cantilena, L.R. Jr. and Klaassen, C.D.: Decreased effectieness of chelation therapy with time after acute cadmium poisoning. Toxicol. Appl. Pharmacol. (Submitted).

106. Cantilena, L.R. Jr. and Klaassen, C.D.: The effect of chelating agents on the excretion of endogenous metals. Toxicol. Appl. Pharmacol. (Submitted).

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108. Watkins, J.B. and Klaassen, C.D.: Effect of inducers and inhibitors of glucuronidation on the biliary excretion and choleretic action of valproic acid in the rat. J. Pharmacol. Exp. Ther. (Submitted).

109. Gregus, Z. and Klaassen, C.D.: Role of ligandin as a binding protein and as an enzyme in the biliary excretion of sulfobromophthalein. J. Pharmacol. Exp. Ther. (Submitted).

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111. Watkins, J.B. and Klaassen, C.D.: Determination of hepatic uridine 5'-diphosphoglucuronic acid by conjugation with diethylstilbestrol. Anal. Biochem. (Submitted).

112. Cagen, S.Z. and Klaassen, C.D.: Evaluation of hepatic storage of sulfobromophthalein in rats and dogs. Toxicology (Submitted).

ROGER S. WETZEL, P.E.

EDUCATION

Virginia Polytechnical Institute, B.S., Civil Engineering, 1970

EXPERIENCE

Mr. Wetzel applies his basic engineering knowledge and background to solutions of environmental problems in the Waste Management and Resource Recovery Group of the JRB Energy and Environmental Program Area. He has managed several projects involving the assessment of environmental factors and the design of waste treatment and disposal facilities. Areas of expertise include treatment, storage and disposal of solid and water-borne wastes, environmental assessment of waste disposal facilities, energy usage and conservation, cost analyses and environmental monitoring. Mr. Wetzel is currently assisting EPA in developing and defending an enforcement action against a company that allegedly dumped large quantities of pesticides into a creek. He is also managing an assessment of alternatives for waste disposal for the State of West Virginia under an EPA program. He has managed a task for handling and disposing of residuals from pretreatment of industrial wastewaters and is currently contributing to the determination of the need for industrial pretreatment programs for selected small communities.

Since joining JRB, he managed an investigation of the best treatment, storage and disposal methods for ignitable, reactive and volatile wastes, which resulted in recommended additions and changes to the Resource Conservation and Recovery Act. He managed a project for transferring information gathered for handling and disposing chemical wastes to low level radioactive waste activities. Volume reduction, waste segregation, and deep and shallow burial alternatives were among those compared for chemical and low level radioactive wastes. An experimental shallow burial facility was designed as part of this project.

Mr. Wetzel made major technical contributions to a project requiring characterization and evaluation of waste disposal sites in EPA's Region II and ranking them by degree of hazard. The ranking system is now being used to set priorities for further site investigation activities nationwide.

As project engineer at Kamer Engineering, Inc., he designed an innovative waste treatment system for a rural community including a plastic pipe collection system, batch treatment and land disposal. He redesigned a waste treatment system for a highway rest area to meet updated discharge regulations.

As an environmental engineer at Hittman Associates, Inc., he was responsible for evaluating industrial processes and waste treatment systems, designing waste treatment and disposal systems, and preparing proposals. Specific activities included:

- Assessment of the environmental effects of coal liquefaction processes. These included developing a water management program for a commercial sized facility, and selecting and costing pollution control equipment (air, water and solid waste) for a Solvent Refined Coal plant.

- Design of a sludge handling and disposal system for a major electric utility company. For this project, Mr. Wetzel selected equipment and prepared plans and specifications for pumps, piping, tankage and polymer feed system using in-pipe static mixing.

- Studies of steam electric power, coil coating, and porcelain enamel industries to set water effluent guidelines. Mr. Wetzel evaluated industrial processes and wastewater treatment systems for pollutant removal, energy usage and cost effectiveness and supervised several wastewater sampling programs.

From 1974 through 1975, he was an environmental engineer with Versar, Inc., where he was responsible for many data gathering, analysis and evaluation activities for water effluent guidelines, industrial hazardous waste disposal, solid waste disposal and operations and maintenance of air pollution control equipment. As a result of these activities, he has gained a thorough knowledge of production processes and waste handling and disposal techniques for the battery industry, secondary aluminum recovery facilities. clay, gypsum, refractory and ceramic products industries, and concrete products.

From 1970 through 1973, Mr. Wetzel actively participated in programs for developing updated design criteria incorporating new construction techniques and materials for airports while with the Federal Aviation Administration. He managed a successful program for development of a skid resistant airport runway marking paint. These projects required the application of basic engineering skills such as soil mechanics, structural analysis, traffic engineering, and materials science.

PUBLICATIONS

Rogoshewski, P.J.; Koester, P.A.; Koralek, C.S.; Wetzel, R.S.; and Shields, K.J. 1978. Standards of practice Manual for the Solvent Refined Coal Liquefaction Process. Prepared under EPA Contract No. 68-02-2162.

Wetzel, R.S. 1979. Wastewater Treatment for the Solvent Refined Coal Process. Proceedings of the 86th National Meeting of the American Institute of Chemical Engineers, April 1-4, 1979.

Publications (Continued)

Kufs, C.; Twedell, D.; Paige, S.; Wetzel, R.; Spooner, P.; Colonna, R.; and Kilpatrick, M. 1980. Rating the Hazard Potential of Waste Disposal Facilities. Proceedings of the National Conference on Management of Uncontrolled Hazardous Waste Sites, October 15-17, 1980.

Paige, S.F.; Morgan, C.H.; Bryson, H.C.; Hunt, G.E.; Rogoshewski, P.J.; Spooner, P.A.; Twedell, D.B.; and Wetzel, R.S. 1980. Preliminary Design and Cost Estimates for Remedial Actions at Hazardous Waste Disposal Sites. Proceedings of the National Conference on Management of Uncontrolled Hazardous Waste Sites, October 15-17, 1980.

GEORGE THOMAS FARMER, JR.

EDUCATION

University of Virginia, B.A., Geology (1958)
University of Virginia, M.S., Geology (1960)
University of Cincinnati, Ph.D., Geology (1968)

EXPERIENCE

Dr. Farmer is a Senior Geologist with JRB's Waste Management Division. He has a broad background in the geological/environmental sciences, and has extensive experience in earth materials and earth processes, in both academia and in private industry. His management experience ranges from originating and staffing an undergraduate geology curriculum at a major college to being a Team Leader and Task Leader with JRB's Hazardous Waste and Materials Balance Group. Currently, Dr. Farmer is Project Manager and Principal Investigator of a comprehensive hydrogeologic investigation of the Naval Air Development Center in Warminster, Pennsylvania, a study involving site investigations, records search, and installation and implementation of a groundwater monitoring system.

In the fall of 1980, Dr. Farmer was a Supervisory Geologist conducting geotechnical work for EPA's study of Love Canal. He is a co-author of JRB's final report on the hydrogeology of the Love Canal area. He is also the Senior Hydrogeologist on a project to develop and implement a site closure plan for a hazardous waste disposal facility in the state of Virginia.

Dr. Farmer has been the Task Leader on a number of Materials Balances for EPA's Office of Pesticides and Toxic Substances (materials balance studies are comprehensive environmental assessments of chemicals including quantitative analyses of production, distribution, and releases to air, land, surface water and groundwater). As Task Leader and Principal Investigator, he was responsible for supervising JRB personnel, interfacing with EPA personnel, planning tasks, and meeting JRB and EPA deadlines. He has also written major portions of the following JRB Materials Balance reports:

- Chlorinated Solvents
- Formaldehyde
- Perchloroethylene
- Cadmium
- Vermiculite

He has also contributed a major section to JRB's "Training Manual for Hazardous Waste Site Investigations" on siting new hazardous waste disposal facilities in conformance with RCRA regulations. He also led a seminar on "Important Criteria for Siting New Hazardous Waste Disposal Facilities" for Region III EPA Headquarters in Philadelphia in May 1980. This seminar was attended by EPA personnel and representatives of state governments throughout the country. He recently presented a seminar to the Pennsylvania

Department of Environmental Resources on the geotechnical site investigation at Love Canal.

Dr. Farmer has just completed a study of peat mining in wetlands for EPA's Region III which involved impacts on surface and groundwater hydrology in northeastern Pennsylvania kettle lakes. This study was published by EPA in July 1981. He is also completing an assessment of the potential for the contamination of drinking water wells from a sludge trenching site in western Montgomery County, Maryland for the National Institutes of Health. This study involves a detailed hydrogeologic analysis and recommendations for monitoring specific pollutants in groundwater.

Dr. Farmer has recently completed a large portion of an assessment of low-level radioactive and hazardous waste disposal alternatives available to the state of West Virginia. This was written as part of JRB's Technical Assistance Panels contract with EPA's Region III. Dr. Farmer wrote sections on the physiography, soils, and bedrock of West Virginia.

Prior to joining JRB, Dr. Farmer was President and Chief Geologist for Valley Consultants, a private consulting firm involved in solving environmental problems associated with coal mining (both strip and deep mining operations) in the central Appalachian coal fields. He has prepared and given expert courtroom testimony on behalf of legal representatives of several clients concerning environmental problems caused by coal mining, including surface water and groundwater contamination. He has dealt specifically with coal-related industrial problems such as the disposal of fly ash, coal ash scrubbers sludge and their concomitant effects on the environment, especially as related to groundwater contamination and the migration of heavy metals through soils and rock. He has written numerous reports concerning the behavior of pollutants and their migration from hazardous waste sites.

Prior to becoming a private consultant, Dr. Farmer was a college and university professor. He was primarily responsible for designing and initiating the major curriculum in geology at James Madison University in Harrisonburg, Virginia in 1965. In 14 years of college teaching, Dr. Farmer taught a variety of undergraduate and graduate courses, including Earth History, Stratigraphy, Field Geology and Regional Geology. He also led field trips throughout the eastern United States and Canada, and conducted research on the stratigraphy and paleoecology of the Paleozoic sedimentary rocks of the Shenandoah Valley in Virginia and the Arbuckle Mountains in Oklahoma. He served on various committees and was responsible for numerous innovative curriculum changes. He is the co-author of a widely-adopted college geology laboratory manual.

Dr. Farmer is a member of numerous professional societies, and is currently listed in American Men and Women of Science. He has also worked as a geologist with Texaco and Roland F. Beers, Inc., a geophysical prospecting firm, where he completed field studies in west Texas, New Mexico, Colorado, Oklahoma, New York, Pennsylvania, Ohio, and Virginia.

PUBLICATIONS AND REPORTS

Description of the concretions from the Millboro black shales in Virginia, Va. J. Sci., Proceeding of the year 1958-59, 10 (New Series #4): 295-296, 1959.

Paleoenvironmental analysis of an Ordovician carbonate clastic sequence in the Shenandoah Valley, Virginia, Va. J. Sci., Proceedings of the year 1973-1974, 25(2): 91, 1974.

The oldest well-preserved bryozoan fauna in the world? Oklahoma Geology Notes, 34(3): 99-101, 1974.

Earth Materials and Earth Processes: An Introduction, 2nd edition, 1977, Burgess Publishing Co., Minneapolis, Minnesota, 284 pp. (adopted by 100 colleges and universities throughout the country as of June 1981).

Instructor's Guide to Earth Materials and Earth Processes: An Introduction, 1977, Burgess Publishing Co., Minneapolis, Minnesota, 61 pages.

Earth Materials and Earth Processes: An Introduction, 3rd edition (in preparation).

Introduction to Physical Geology, (in preparation, 13 chapters completed).

Draft Report: Chlorinated Solvents. Prepared for U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, Contract No. 68-01-5793, Task #14, Dec. 14, 1979.

Executive Summary Level I Materials Balance: Formaldehyde. Prepared for U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, Survey and Analysis Division, Contract No. 68-01-5793, Task #17, Feb. 15, 1980.

Draft Interim Report Level I Materials Balance: Perchloroethylene. Prepared for U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, Survey and Analysis Division, Contract No. 68-01-5793, Task #23, Apr. 1, 1980.

Chapter 15: Important Criteria in Siting Hazardous Waste Disposal Facilities, in Training Manual for Hazardous Waste Site Investigations, prepared for the U.S. Environmental Protection Agency, Contract No. 68-01-6003, Task #6, May 10, 1980.

Final Draft Interim Report: Level I Materials Balance: Formaldehyde. Prepared for the U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, Survey and Analysis Division, Contract No. 68-01-5793, Task #17, May 27, 1980.

PUBLICATIONS AND REPORTS (Continued)

Draft Final Report: Level I Materials Balance for Chlorinated Solvents. Prepared for the U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, Survey and Analysis Division, Contract No. 68-01-5793, Task #14, Jul. 11, 1980.

Land Disposal Practices for Specific Hazardous Wastes. Prepared for U.S. Environmental Protection Agency, Office of Solid Waste, Land Disposal Branch, Contract No. 68-01-5052, DOW No. 36, Task #1, May 1, 1981.

Draft Final Level II Materials Balance: Cadmium, (3 Vols.). Submitted to U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, Exposure Evaluation Division, Contract No. 68-01-5793, Sept. 5, 1980.

Assessment of Hydrogeologic Potential for Migration of Pollutants from Sludge Trenching Site 38 to the National Institutes of Health Animal Center Drinking Water Wells, Montgomery County, Maryland. Submitted to National Institutes of Health, EES/EPB/DS, Mar. 9, 1981.

Disposal Alternatives for Hazardous and Low-Level Radioactive Wastes. Submitted to State of West Virginia, Department of Health, EPA Contract No. 68-01-6003, Task #21, Jun. 1981.

The Groundwater Monitoring Program at Love Canal. Submitted to GCA Corporation, Bedford, MA, Sept. 1981.

Peat Mining: An Initial Assessment of Wetlands Impact and Measures to Mitigate Adverse Effects, U.S. Environmental Protection Agency, Contract No. 68-01-6087, Task #8, Jul. 1981 (available through NTIS, Springfield, Virginia).

Hydrogeologic Investigation of the Naval Air Development Center Waste Disposal Sites, Warminster, Pennsylvania. Submitted to U.S. Navy, NADC, Warminster, Pennsylvania, Contract No. DAAB07-79-G-C203, Dec. 21, 1981.

PROPOSED COST ESTIMATES

Use or disclosure of proposal data is subject to the restriction on the Title page of this Proposal

CONTRACT PRICING PROPOSAL

Office of Management and Budget Approval No. 29-RO184

This form is for use when *(i)* submission of cost or pricing data (see FPR 1-3.807-3) is required and *(ii)* substitution for the Optional Form 59 is authorized by the contracting officer.

PAGE NO. | NO. OF PAGES

NAME OF OFFEROR	SUPPLIES AND/OR SERVICES TO BE FURNISHED
JRB Associates	Expert Toxicologist and Case Assistance for EPA Region V
HOME OFFICE ADDRESS: 8400 Westpark Drive, McLean, Virginia 22102	
DIVISION(S) AND LOCATION(S) WHERE WORK IS TO BE PERFORMED: 817 - McLean	TOTAL AMOUNT OF PROPOSAL: $ 24,228
GOV'T SOLICITATION NO.: 68-03-3113 (42-6)	

DETAIL DESCRIPTION OF COST ELEMENTS

1. DIRECT MATERIAL *(Itemize on Exhibit A)*	EST COST ($)	TOTAL EST COST	REFERENCE
a. PURCHASED PARTS			
b. SUBCONTRACTED ITEMS			
c. OTHER—(1) RAW MATERIAL			
(2) YOUR STANDARD COMMERCIAL ITEMS			
(3) INTERDIVISIONAL TRANSFERS *(At other than cost)*			
TOTAL DIRECT MATERIAL			
2. MATERIAL OVERHEAD *(Rate % x $ base =)*			

3. DIRECT LABOR *(Specify)*	ESTIMATED HOURS	RATE/HOUR	EST COST ($)		
Level IVc Senior Engineer - Wetzel	84	16.00	1,344		
Level IVc Senior Hydrogeologist - Farmer	50	16.00	800		
Project Administrator	16	10.08	161		
Clerical	48	7.12	342		
TOTAL DIRECT LABOR				2,647	

4. LABOR OVERHEAD *(Specify Department or Cost Center)*	O.H RATE	x BASE =	EST COST ($)		
Overhead	60%	2,647	1,588		
Fringe	34%	2,647	900		
TOTAL LABOR OVERHEAD				2,488	

5. SPECIAL TESTING *(Including field work at Government installations)*	EST COST ($)		
TOTAL SPECIAL TESTING			
6. SPECIAL EQUIPMENT *(If direct charge) (Itemize on Exhibit A)*			
7. TRAVEL *(If direct charge) (Give details on attached Schedule)*	EST COST ($)		
a. TRANSPORTATION			
b. PER DIEM OR SUBSISTENCE			
TOTAL TRAVEL	3,616	3,616	

8. CONSULTANTS *(Identify—purpose—rate)*	EST COST ($)		
150 hrs. @ $62.50/hr.	9,375		
Travel Costs (see Exhibit A for breakdown)	1,774		
TOTAL CONSULTANTS		11,149	
9. OTHER DIRECT COSTS *(Itemize on Exhibit A)*		916	
10. *TOTAL DIRECT COST AND OVERHEAD*		20,816	
11. GENERAL AND ADMINISTRATIVE EXPENSE *(Rate 13 % of cost element Nos. 2-9)*		2,706	
12. ROYALTIES			
13. *TOTAL ESTIMATED COST*		23,522	
14. FEE OR PROFIT @ 3% base fee		706	
15. *TOTAL ESTIMATED COST AND FEE OR PROFIT*		24,228	

OPTIONAL FORM 60
October 1971
General Services Administration
FPR 1-16.806
5060-101

This proposal is submitted for use in connection with and in response to *(Describe RFP, etc.)*

EPA Contract No. 68-03-3113
JRB Project No. 2-817-03-956-47

and reflects our best estimates as of this date, in accordance with the Instructions to Offerors and the Footnotes which follow.

TYPED NAME AND TITLE	SIGNATURE
Betty M. Bidwell Contracts Administrator	Betty M. Bidwell

NAME OF FIRM	DATE OF SUBMISSION
JRB Associates	2/18/82

EXHIBIT A—SUPPORTING SCHEDULE *(Specify. If more space is needed, use reverse)*

COST EL NO.	ITEM DESCRIPTION *(See footnote 5)*	EST COST *($)*
	OTHER DIRECT COSTS	
	Reproduction: 3,000 copies @ $.07/copy	210
	Long Distance Telephone: 75 calls @ $5/call	375
	Postage/Telecopy/Delivery	250
	Basic Telephone: 198 hrs. @ $.41/hr.	81
		916
	JRB TRAVEL	
	3 mtgs. in Chicago, 2 people @ $368/RT Airfare	2,208
	1 mtg. in Detroit, 2 people @ $262/RT Airfare	524
	Hotel: 2 people, 4 nights @ $50/night	400
	Car Rental: 4 days @ $40/day	160
	Per Diem: 4 days @ $28/day, 2 people	224
	Local Travel: 300 miles @ $.20/mile	60
	Parking: 4 trips @ $5/trip, 2 people	40
		3,616
	CONSULTANT TRAVEL	
	Parking: 4 trips @ $5/trip	20
	3 mtgs. in Chicago @ $296/RT Airfare	888
	1 mtg. in Detroit @ $374/RT Airfare	374
	Hotel: 4 nights @ $50/night	200
	Car Rental: 4 days @ $40/day	160.
	Per Diem: 4 days @ $28/day	112
	Local Travel: 100 miles @ $.20/mile	20
		$1,774

I. HAS ANY EXECUTIVE AGENCY OF THE UNITED STATES GOVERNMENT PERFORMED ANY REVIEW OF YOUR ACCOUNTS OR RECORDS IN CONNECTION WITH ANY OTHER GOVERNMENT PRIME CONTRACT OR SUBCONTRACT WITHIN THE PAST TWELVE MONTHS?

[X] YES [ ] NO *(If yes, identify below.)*

NAME AND ADDRESS OF REVIEWING OFFICE AND INDIVIDUAL	TELEPHONE NUMBER/EXTENSION
Mr. Peter Roppollo, DCAA 5600 Columbia Pike, Rm. 319, Falls Church, VA 22041	703/756-1110

II. WILL YOU REQUIRE THE USE OF ANY GOVERNMENT PROPERTY IN THE PERFORMANCE OF THIS PROPOSED CONTRACT?

[ ] YES [X] NO *(If yes, identify on reverse or separate page)*

III. DO YOU REQUIRE GOVERNMENT CONTRACT FINANCING TO PERFORM THIS PROPOSED CONTRACT?

[ ] YES [X] NO *(If yes, identify.)*: [ ] ADVANCE PAYMENTS [ ] PROGRESS PAYMENTS OR [ ] GUARANTEED LOANS

IV. DO YOU NOW HOLD ANY CONTRACT *(Or, do you have any independently financed (IR&D) projects)* FOR THE SAME OR SIMILAR WORK CALLED FOR BY THIS PROPOSED CONTRACT?

[ ] YES [X] NO *(If yes, identify.)*:

V. DOES THIS COST SUMMARY CONFORM WITH THE COST PRINCIPLES SET FORTH IN AGENCY REGULATIONS?

[X] YES [ ] NO *(If no, explain on reverse or separate page)*